SAFETY DATA SHEET

[Required under safety and health regulations for shipping and handling]

Version: 2023
Date Updated: Jan. 10, 2023

SECTION 1. - - - - - - - - - PRODUCT AND COMPANY IDENTIFICATION- - - - - - - - - -

Product Name	DMSO - Dimethyl Sulfoxide
Product Code(s)	D0231
Recommended Use	For Laboratory Research Use Only Not for Human or Animal Drug Use
Supplier	Bio Basic Inc.
Address	20 Konrad Crescent, Markham, Ontario, Canada, L3R 8T4
Telephone	(905) 474 4493
Fax	(905) 474 5794
For Chemical Emergency Phone#	(416) 995 9730

SECTION 2. - - - - - - - - - - HAZARDS IDENTIFICATION - - - - - - - - -

Classification of the substance or mixture

GHS Classification in accordance with Hazardous Products Regulations (HPR) (SOR/2015-17)

Flammable liquids (Category 4), H227

For the full text of the H-Statements mentioned in this Section, see Section 16.

GHS Label elements, including precautionary statements

Pictogram	none
Signal word	Warning
Hazard statement(s)	
H227	Combustible liquid.
Precautionary statement(s)	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P280	Wear protective gloves/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403	Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

SECTION 3. - - - - - COMPOSITION/INFORMATION ON INGREDIENTS - - - - - -

Chemical Name	EC No.	CAS-No	Weight %
Dimethyl sulfoxide	200-664-3	67-68-5	≤100

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SECTION 4. - - - - - - - - - - FIRST-AID MEASURES- - - - - - - - - - -

Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labeling (see section 2) and/or in section 11

Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5. - - - - - - - - - FIRE FIGHTING MEASURES - - - - - - - - - -

Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special hazards arising from the substance or mixture
Carbon oxides, Sulfur oxides , Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapors possible in the event of fire.

Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

Further information
Use water spray to cool unopened containers.
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. - - - - - - - - ACCIDENTAL RELEASE MEASURES- - - - - - - - -

Personal precautions, protective equipment and emergency procedures

Avoid breathing vapors, mist or gas. Remove all sources of ignition. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. For personal protection see section 8.

Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed

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containers for disposal.

Reference to other sections
For disposal see section 13.

SECTION 7. - - - - - - - - - - HANDLING AND STORAGE- - - - - - - - - - -

Precautions for safe handling
Avoid inhalation of vapor or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge.
For precautions see section 2.

Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. hygroscopic
Storage class (TRGS 510): 10: Combustible liquids

Specific end use(s)
Apart from the uses mentioned in section 1 no other specific uses are stipulated

SECTION 8. - - - - - EXPOSURE CONTROLS/PERSONAL PROTECTION- - - - -

Control parameters

Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact Material:
Nitrile rubber
Minimum layer thickness: 0.2 mm Break through time: 38 min

If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government

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standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9. - - - - - - - PHYSICAL AND CHEMICAL PROPERTIES - - - - - - -

Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: clear
b)	Odour	Odorless
c)	Odour Threshold	No data available
d)	pH	Not applicable
e)	Melting point/freezing point	Melting point/range: 16 - 19 °C (61 - 66 °F)
f)	Initial boiling point and boiling range	189 °C 372 °F
g)	Flash point	87 °C (189 °F) - closed cup - ASTM D 93
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 42 %(V) Lower explosion limit: 3.5 %(V)
k)	Vapor pressure	0.55 hPa at 20 °C (68 °F) 4 hPa at 50 °C(122 °F)
l)	Vapor density	2.70 - (Air = 1.0)
m)	Relative density	1.1 g/mL
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -1.3 5 at 20 °C(68 °F)
p)	Auto-ignition temperature	300 - 302 °C (572 - 576 °F)
q)	Decomposition temperature	> 190 °C (> 374 °F) -
r)	Viscosity	No data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

Other safety information

Solubility in other solvents	Alcohol - soluble Diethylether - soluble
Surface tension	43.5 mN/m at 20 °C (68 °F)
Relative vapor Density	2.70 - (Air = 1.0)
Dissociation constant	35.1

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SECTION 10. - - - - - - - - -STABILITY AND REACTIVITY - - - - - - - - -

Reactivity
Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
Risk of explosion with:
Acetylidene, organic halides, perchlorates, Acid chlorides, nonmetallic halides, iron(III) compounds, nitrates, fluorides, chlorates, hydrides, perchloric acid, Oxides of phosphorus, Nitric acid, silver compounds, silicon compounds, silanes, acid halides.

Exothermic reaction with:
boron compounds, oxyhalogenic compounds, Potassium, sodium, Strong oxidizing agents, phosphorus halides, strong reducing agents, Acid chlorides, Strong acids, silver salt, nitrogen dioxide.

Risk of ignition or formation of inflammable gases or vapours with:
potassium permanganate

Conditions to avoid
Heat, flames and sparks.

Incompatible materials
various plastics, Metals

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides

Other decomposition products - No data available In the event of fire: see section 5

SECTION 11. - - - - - - - - - TOXICOLOGICAL INFORMATION - - - - - - - -

Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 28,300 mg/kg
(OECD Test Guideline 401)
LC0 Inhalation - Rat - male and female - 4 h - > 5.33 mg/l
(OECD Test Guideline 403)
LD50 Dermal - Rat - male and female - 40,000 mg/kg
Remarks: (ECHA)
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: slight irritation - 4 h
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: slight irritation - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig

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Result: negative
(OECD Test Guideline 406)
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Test Type: sister chromatid exchange assay
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 479
Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Rat

Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative

Carcinogenicity
No data available

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
Repeated dose toxicity - Rat - male and female - Oral - 18 Months - NOAEL (No observed adverse effect level) - 3,300 mg/kg - LOAEL (Lowest observed adverse effect level) - 9,900 mg/kg

Repeated dose toxicity - Monkey - male and female - Dermal - 18 Months - NOAEL (No observed adverse effect level) - >= 8,910 mg/kg - LOAEL (Lowest observed adverse effect level) - 990 mg/kg

RTECS: PV6210000
Exposure to large amounts can cause:, redness of skin, Itching, burning, sedation, Headache, Nausea, Dizziness
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Eyes - Eye disease - Based on Human Evidence

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SECTION 12. - - - - - - - - - ECOLOGICAL INFORMATION - - - - - - - - - -

Toxicity

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - > 25,000 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 24,600 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 17,000 mg/l - 72 h (OECD Test Guideline 201)

Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 31 % - this product is not readily biodegradable. (OECD Test Guideline 301D)

Bioaccumulative potential
No data available

Mobility in soil
No data available

Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

Other adverse effects
No data available

Stability in water	- 0.12 - 1.2 h at 30 °C Remarks: Hydrolyses readily.

SECTION 13. - - - - - - - - - DISPOSAL CONSIDERATIONS - - - - - - - - -

Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14. - - - - - - - - - - TRANSPORT INFORMATION - - - - - - - - -

IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15. - - - - - - - - - REGULATORY INFORMATION - - - - - - - - - -

This product has been classified in accordance with the hazard criteria of the Hazardous Products Regulations (HPR) and the SDS contains all the information required by the HPR.

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SECTION 16. - - - - - - - - - - OTHER INFORMATION- - - - - - - - - - - -

Further information: no limited for paper copy, just for internal uses.
For research use only. Not intended for human or animal diagnostic or therapeutic uses.

Disclaimer

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

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End of SDS

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CERTIFICATE OF ANALYSIS

Product	Dimethyl Sulfoxide(DMSO)
Grade	ACS
Product Code	D0231
Mol. Formula	$(CH_3)_2SO$
Mol. Weight Lot No.	78.13
CAS#	67-68-5
Lot No.	

Test Items	Specifications	Actual Results
Appearance	Clear, Colorless Liquid	
Assay	≥99.9%	
Residue after evaporation	≤0.01%	
Titrable acid	≤0.001 meq/g	
Water(coulometric KF)	≤ 0.1%	

Storage: RT.

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Product Information

Dimethyl sulfoxide

Product Name: Dimethyl sulfoxide
Product Code: D0231
Grade: ACS

Product Description

Molecular Formula: C2H6OS
Molecular Weight: 78.13
CAS Number: 67-68-5
Melting Point: 18.45 °C
Boiling Point: 189 °C
Density: 1.1 g/ml
Dielectric Constant: 45
Viscosity: 1.1 centipoises (27 °C)
Synonyms: DMSO, methyl sulfoxide, dimethyl sulphoxide

Dimethyl sulfoxide (DMSO) is a highly polar organic reagent that has exceptional solvent properties for organic and inorganic chemicals. Among its uses in organic synthesis is the oxidation of thiols and disulfides to sulfonic acids. Other reactions in which DMSO participates include the hydrolysis of epoxides, the thioalkylation of phenols, and the oxidation of primary alcohols, primary halides, and esters of primary alcohols to aldehydes.

The compatibility of DMSO with various materials is listed below:
- Compatible: LDPE, HDPE, polypropylene, PPCO (polypropylene copolymer), polymethylpentene, nylon, teflon FEP
- Moderately compatible: polystyrene, ECTFE/ETFE
- Incompatible: polysulfone, flexible and rigid PVC tubing, polycarbonate

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This product is miscible in water (1 ml DMSO + 1 ml H2O), yielding a clear, colorless solution. DMSO is a very hygroscopic liquid and should be protected from exposure to moisture. DMSO is also soluble in ethanol, acetone, ether, benzene, and chloroform.

Storage/Stability

Store at Room Temperature.

DMSO supercools easily and remelts slowly at room temperature. The product may arrive as a solid instead of a liquid. The solidified product can be reliquified by warming to room

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temperature without detriment to the product. DMSO is stable up to 100 °C in alkaline, acidic and neutral conditions. At temperatures approaching its boiling point, DMSO is stable in neutral or alkaline conditions.

To prepare a sterile filtered DMSO solution, it is recommended to use a teflon or nylon membrane. Cellulose acetate membranes are not recommended.

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